Intermediate Excel

Spring 2011

Combination Cell References

- How do $A1 and A$1 differ from A1?

	A	B	C	D	E
1	4	8	=A1/A3		
2	6	4	=A$1*$B4+B2		
3	=A1+A2		1		
4					
5					

- What formula would result in cell D1 if you copy the formula from cell C1 to D1?

- What formula would result in cell E5 if you copy the formula from C2 to E5?

Problem 4.1

	A	B	C	D	E
1	**Item #**	**Product**	**Price**	**After Discount A**	**After Discount B**
2	125A	Scooter	$59.99		
3	789A	Tricycle	$129.95		
4	78B	Ball	$12.35		
5	489A	Doll	$21.99		
6	57B	Art Kit	$14.95		
7					
8	**Discounts**				
9	A	B			
10	10%	20%			

For the above worksheet, write a formula in the highlighted cell in such a way that you can fill down and then across to calculate the other prices.

Use Named Cells where appropriate.

Debug Your Worksheet

- Select cell D2 and use "Trace Precedents" in the Formulas Tab to see which cells are used by cell D2.
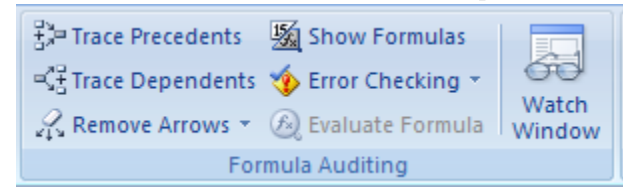
- Select cell B10 and use "Trace Dependents" to see which cells use B10.

- Click "Remove Arrows" to remove the tracing lines at any given time.

More Excel Functions

- In general, Excel functions take the form: name(arg1, arg2,…) where the number of arguments depends on the function being used.

Find a function in the Math & Trig library that uses two arguments. Show how the function works.

Range of Cell Values

- The : between cell references indicates a range of values inclusive. So, A1:A5 means include cells A1, A2, A3, A4, A5.

Any ideas how we might rewrite the formula =A1+A2+A3+A4+A5

- Excel is not case-sensitive. What does this mean?

Variety of Functions

- Excel has over 350 built-in functions divided into related categories.
- To invoke the "Paste Function" dialog box, click on the f_x icon on the tool bar.
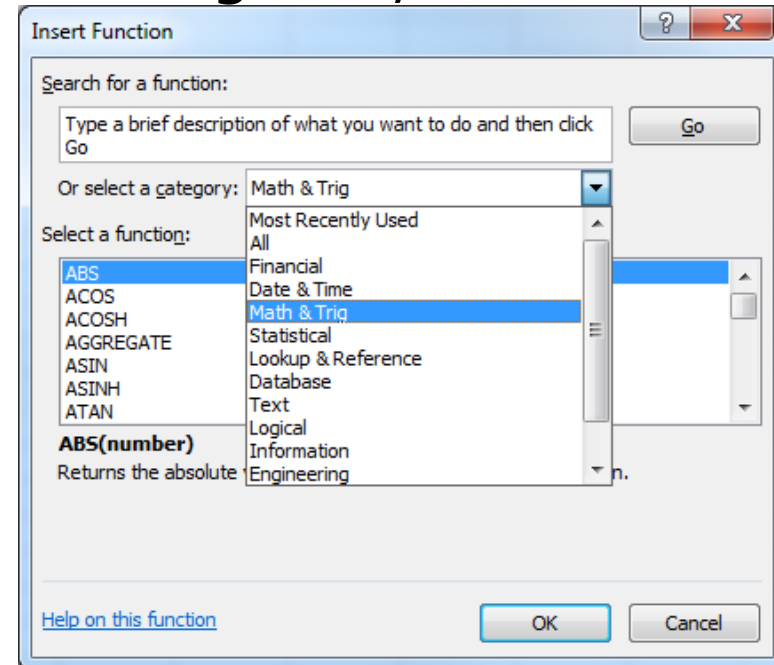
Financial Built-in Functions

- The financial functions can be isolated in Excel. Simply go to the Function Library on the Formulas tab and select Financial.

- PMT Function
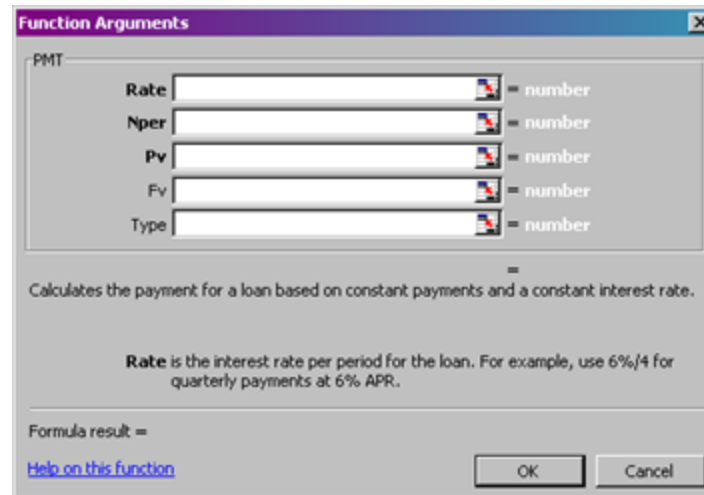
PMT Function

- The PMT function calculates the payment for a loan based on constant payments and a constant interest rate

- Syntax is **PMT(rate,nper,pv,fv,type)** where
  - **rate** is the interest rate for the loan
  - **nper** is the total number of payments for the loan
  - **pv** is the present value, or the total amount that a series of future payments is worth now; also known as the principal
  - **fv** is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (zero), that is, the future value of a loan is 0
  - **type** is the number 0 (zero) or 1 and indicates when payments are due (0 = end of month = default while 1 = beginning of month)

PMT Function Continued

- Remarks
  - The payment returned by PMT includes principal and interest.

  - Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at an annual interest rate of 12 percent, use 12%/12 for rate and 4*12 for nper. If you make annual payments on the same loan, use 12 % for rate and 4 for nper.

PMT Function Continued

- Examples
  - The following formula returns the monthly payment on a $10,000 loan at an annual rate of 8 percent that you must pay off in 10 months:
    - ➤ =PMT(8%/12, 10, 10000) equals -$1,037.03
    - ➤ Why is this negative?

  - For the same loan, if payments are due at the beginning of the period, the payment is:
    - ➤ =PMT(8%/12, 10, 10000, 0, 1) equals -$1,030.16
    - ➤ Why?

PMT Function Continued

- The following formula returns the amount someone must pay to you each month if you loan that person $5,000 at 12 percent and want to be paid back in five months:
  - ➢ =PMT(12%/12, 5, -5000) equals $1,030.20
  - ➢ Let's break down each argument to understand this

- You can use PMT to determine payments to annuities other than loans. For example, if you want to save $50,000 in 18 years by saving a constant amount each month, you can use PMT to determine how much you must save. If you assume you'll be able to earn 6 percent interest on your savings per year, you can use PMT to determine how much to save each month.
  - ➢ =PMT(6%/12, 18*12, 0, 50000) equals -$129.08
  - ➢ If you pay $129.08 into a 6 percent savings account every month for 18 years, you will have $50,000.

Problem 4.2

Imagine that you want to purchase a car worth $29,899. The car dealer is ready to grant you a 5-year loan at 6.5% annual interest rate, but you must put down 10% of the car price as down payment.

Design an Excel spreadsheet to allow the user the ability to input:

(a)The price of the car, (b)The yearly interest rate, (c)The period of the loan in years

Your spreadsheet should then compute and display:

(d)The amount of the down payment, (e) The amount of the loan , (f) The monthly payment of the loan

Be sure to **Name** each of the input cells appropriately.

Problem 4.2 Continued

	A	B	C
1	**Car Loan**		
2			
3	Enter Car Price		
4	Enter Yearly Interest Rate		
5	Enter Time in Years		
6			
7	**Down Payment Is**		
8	**Loan Amount Is**		
9	**Monthly Payment Is**		

Once you get the above worksheet working, add a row that shows the total interest paid.

Problem 4.2 Continued

Add a payment schedule to your current worksheet with columns: Payment #, Starting Balance, Monthly Payment, Monthly Interest, and Ending Balance.

Payment #	Starting Balance	Monthly Payment	Interest	Ending Balance
1	$26,909.10	$526.51	$145.76	$26,528.35
2	$26,528.35	$526.51	$143.70	$26,145.54
3	$26,145.54	$526.51	$141.62	$25,760.65
4	$25,760.65	$526.51	$139.54	$25,373.68
..	….	….	….	…..

Problem 4.2 Continued

How can you be sure that your payment schedule is correct?

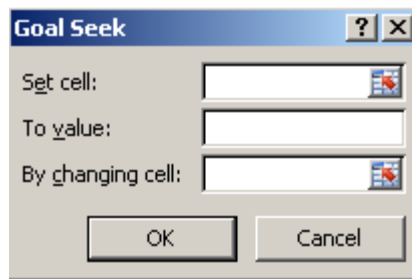Change the interest rate to 6%. Does your worksheet update correctly?

What-If Analysis & Goal Seeking

- Using Excel to scrutinize the impact of changing values in cells that are referenced by a formula in another cell is called what-if analysis.
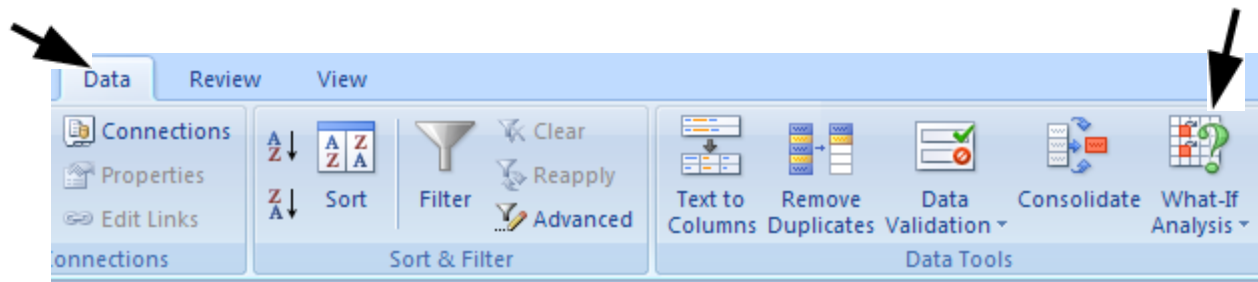
Goal Seek Question

How much car can I afford if I am willing to pay $600 a month under the initial scenario?

Problem 4.3 Goal Seek

www.happyplanetindex.org

The HPI is calculated as follows:

Alpha and Beta are derived

$$HPI = \frac{Happy\ Life\ Years}{Ecological\ Footprint + \alpha} * \beta$$

$$Happy\ Life\ Years = \frac{Life\ Satisfaction * Life\ Expectancy}{10}$$

Life Satisfaction: 2005 Gallup World Pool and the World Values Survey

Ecological footprint: "the amount of land required to provide for all their resource requirements plus the amount of vegetated land required to sequester (absorb) all their CO_2 emissions".

Goal Seek

- What Life Expectancy do we need to the US to have an HPI of 89?

- What Ecological Footprint do we need in the US to have an HPI of 89?

	A	B	C	D	E	F	G	H	I	J	K	L
1		Happy Planet Index			Happy Life Years			Ecological Footprint			alpha	beta
2		30.9877			61.541			9.4			3.35	6.42
3								Life Satisfaction			Life Expectancy	
4								7.9			77.9	
5												

- Conditional Formatting

Let's import some big data
Flight Data Link on the online schedule

http://www.transtats.bts.gov/DL_SelectFields.asp?Table_ID=236&DB_Short_Name=On-Time

Pre-zipped File

Download

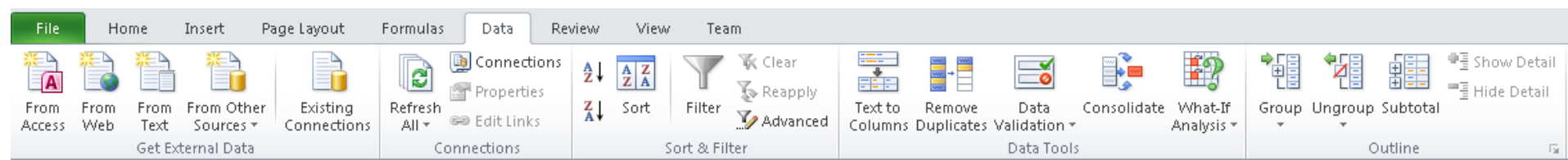Open .zip file then Drag Excel workbook to desktop

This make take a few minutes….

Keep the top row on the screen

Let's do some analysis

- Average Delay time? (ArrDelayMinutes)
- Number of cancellations? (Cancelled)
- Number of diverted flights? (Diverted)
- Maximum distance? (Distance)
- Minimum distance?
- Find the average distance of cancelled flights!
  averageif()

Data Tab!